A Coal State Regulatory Perspective on Clean Coal

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Good afternoon. Thank you for inviting me to represent the Kentucky Public Service Commission at this important event.

Conferences such as this are especially meaningful to us in Kentucky, because no other state's past, present and future are as closely tied to coal as is ours. Coal is woven as tightly into the economic, social and historic fabric of our Commonwealth as any other aspect of Kentucky – be it racehorses, bourbon or burley tobacco.

I have been a utility regulator for less than three years. But I have grown up with coal.

My ancestors came to Harlan County, Kentucky, more than two centuries ago, long before Harlan became almost synonymous with Appalachian coal. Although my family was not in the coal business – I'm a fourth-generation country lawyer – for the last century, our lives have been intertwined with the coal industry.

For four generations, my family has represented coal operators and coal miners. They were – and are – our friends and neighbors. My understanding of the coal industry begins with the mountains from which it is extracted and with the people who turn rock into fuel. (I suppose you could say that, since my family also has represented a few people who illicitly turn corn into ethanol, I have a certain understanding of biofuels.)

As anyone who grew up in the coalfields can tell you, every aspect of life in a town like Harlan is intimately connected to the mines. When the industry prospers, we all do well. When it suffers, we all share its pain.

So my interest in today's topic is not just that of someone who regulates companies that rely on coal as a fuel. It is a deep and abiding personal interest that encompasses both my family's past and the future of my community.

One of the first things I learned when I came to the PSC is that every member of the Commission is entitled to – is, in fact, expected to – brag about one salient fact: Kentucky consistently has among the lowest average electric rates in the country. On average, Kentucky consumers pay about 4.9 cents for each kilowatt-hour of electricity they consume. Those low costs have been a huge factor in driving economic development in our state.

While it is tempting to simply attribute the low rates to the brilliant work done by the PSC, the reality is that those rates are built on coal. On average, coal is used to generate about 90 to 95 percent of the electricity used in Kentucky.

Kentucky is the third-largest coal producing state in the country, trailing only Wyoming and West Virginia. Production in 2005 was 120 million tons.

Consumption was 41 million tons, the vast majority of it used in electric generation. And Kentucky still has almost 30 billion tons of recoverable reserves.

About sixty percent of the electricity generated in Kentucky is produced by burning Kentucky coal. For environmental, operational and economic reasons, the rest comes from other states, the vast majority of it from West Virginia, with smaller shares from other neighboring states and some from as far away as Colorado and Wyoming.

That coal is consumed in more than 20 power plants, ranging in capacity from 75 megawatts to 2,558 megawatts.

While those plants represent only about three-fourths of Kentucky's generating capacity, they produce, as I've noted earlier, better than 90 percent of our electricity, and at very low cost.

Even if Kentucky were to develop no new generating capacity that used coal either as a fuel or a feedstock, coal would remain the dominant source of our electricity for many decades. While some of our plants are nearing the ends of their projected life spans, many are in the prime of mid-life and others are relative youngsters.

And, as we all know, utilities are constantly finding ways to extend the life of their generating capacity. With so much of our generation fleet already paid for, it makes little sense – at least from an economic standpoint – to replace it with new facilities that will inevitably lead to higher rates.

That is not to suggest that utilities in Kentucky are not investing in new generating capacity, because, as I'll explain in more detail later, they are. But they also are finding that it is very cost-effective to upgrade and modernize their current facilities, often to meet new and more stringent environmental requirements.

Perhaps the most noteworthy aspect of our state's situation is that Kentucky has been able to sustain coal-fired generation and low-cost electricity while doing more than most states to protect the environment. In the eastern half of the nation, Kentucky leads the way in the percentage of generating capacity that is equipped with scrubbers to remove sulfur dioxide. And that percentage is climbing. Kentucky utilities also continue to add equipment to remove particulates and nitrogen oxides from their exhaust streams.

So what we have in Kentucky is a utility industry that produces low-cost electricity by burning coal in an environmentally sound manner. The challenge for us is to find ways to extend that happy circumstance into a future that is likely to pose greater challenges to those who wish to construct new coal-utilizing generation facilities.

Those challenges already include increasingly strict limits on sulfur dioxide and nitrogen oxide emissions and new requirements to reduce emissions of mercury. But by far the greatest challenge will be posed by the pressure to reduce greenhouse gases, particularly carbon dioxide.

It does not matter whether or not one believes that the earth is getting warmer. It is irrelevant whether you believe that global warming is a serious problem. It makes no difference what view one has of the role of fossil fuel combustion in producing global climate change.

In one sense, it's even not all that important that the scientific consensus is undeniably in support of all three of those propositions.
That is because what really counts is that the POLITICAL and POLICY realities are moving in the direction of reducing, controlling or restricting carbon emissions created by the use of coal to generate electricity. Any view that we can simply continue into the indefinite future building conventional coal-fired power plants – albeit ones with enhanced pollution controls – is simply unrealistic.

That realization is beginning to take hold in the utility industry, even in a state as heavily dependent on coal as Kentucky. Since 2004, the chief executive officers of all three the investor-owned utilities operating in Kentucky – EON US, Duke Energy and American Electric Power – have, much to their credit, acknowledged the scientific, political and policy realties of global climate change and have

positioned their companies among the private and public entities that are looking for new and better ways to continue using coal.

Those new and better ways will require a new generation, or perhaps several new generations of technology, to convert coal into electrons.

The key questions then become:

- What will those new technologies be?
- How do we make the transition?

I confess to a limited mastery of the chemistry, physics and engineering that underlie power generation. I understand the basic flow chart that tracks a path from coal to steam to turbine to generator to electricity, but don't ask me to explain how it all works. So my view of the future of coal-based electric generation is based on some broad generalizations, rather than any in-depth knowledge of the advantages or disadvantages of particular technological approaches.

Those broad generalizations are these:

- The next generation of coal-based generation will rely on the conversion of coal into a combustible gas. This is, after all, a proven concept that will be refined through what are likely to be several iterations, including both FutureGen and other IGCC approaches.
- It almost goes without saying that all new generation technologies must represent improvement with respect to emissions of those pollutants limited under existing statues – notably sulfur dioxide, nitrogen oxides, particulates and mercury.
- The next generation of technologies will be required to either produce fewer atmospheric carbon emissions per unit of electricity generated or produce those carbon emissions in a form that is more readily sequestered.

- Deployment of the next generation of technologies will increase the per-kilowatt-hour cost of electricity. Even if the entire cost of development of these technologies were to be borne by society as a whole – which it will not be – it is ratepayers who ultimately will fund the construction and operation of these facilities, whether they are built by vertically integrated regulated utilities or by unregulated independent power producers.

The specific technological choices that utilities will have to make are of critical importance. But, from a regulatory standpoint, they are more the province of environmental protection agencies than of utility commissions. In Kentucky, state regulatory policy has been largely technology-neutral and, perhaps surprisingly, fuel-neutral. The only exception has been a prohibition on nuclear facilities until a national repository for high-level radioactive waste becomes operational. For the most part, however, certification of new electric generation facilities has focused on three factors: need, reliability and cost.

Although conservation measures can and should be employed to postpone the need for costly new generating facilities, the construction of those new facilities is inevitable, even if only to replace existing facilities as they are retired from service.

Thus reliability and cost emerge as the determining criteria in the decisions that utility regulators will be required to make, both as new technologies become available and in the transition period to those new technologies.

In Kentucky, that transition period has already begun. In the last five years, both regulated utilities and independent power producers have proposed new generating facilities that include the latest iteration of conventional coal-fired plants, the next stage in coal-burning technology and the first stage of technologies that convert coal rather than combusting it.

At the conventional end of the spectrum, we have on the drawing boards two plants that represent the most advanced pulverized coal combustion technology, with attendant pollution controls designed to meet the more stringent current standards. EON.US is preparing to build a 750-megawatt unit at its Trimble County Station in order to meet projected increased baseload demand in the year 2010. Given the timing, nature and amount of new demand, sticking with a proven, relatively low-cost technology was the best option.

Thoroughbred Generation, an independent power producer that is a subsidiary of Peabody Energy, made a similar choice in planning its 1,500-megawatt plant in Muhlenberg County in western Kentucky. While that facility has received most of the needed regulatory approvals, its air permit is being challenged in court and it is unclear when the project might move forward.
Whether these two facilities prove to be the last big pulverized coal plants built in Kentucky remains to be seen, but that is a distinct possibility.

We already are seeing the next generation of coal-burning facilities come on line. East Kentucky Power Cooperative, which provides wholesale power to 17 rural electric cooperatives, also is planning to increase the capacity of its generating fleet by nearly 750 megawatts in this decade. But it is taking a different approach – adding three circulating fluidized bed units of about 250 megawatts each. One of those has been in service for nearly two years, another is under construction and the third is awaiting regulatory approvals. In opting to build CFB units, East Kentucky Power chose a newer, but proven, technology that can meet current environmental standards with fewer complex emission control devices attached.

Two of the four independent power producers who sought construction certificates from the Kentucky State Board on Electric Generation and Transmission Siting also proposed CFB facilities. Neither is yet under construction.

Circulating fluidized bed, while a technological advance, is not yet what is commonly thought of as “clean coal” – that sought-after methodology whose byproducts – carbon dioxide excepted – are largely inert or innocuous. The one clean coal project that has been attempted in Kentucky in recent years unfortunately demonstrated some of the difficulties encountered in making the transition to new ways of utilizing coal.

As originally proposed, the facility, which received funding from the federal Clean Coal program, was to have produced synthetic gas from a mixture of coal and other feedstocks. The principal other feedstock was to be pelletized municipal solid waste from the Northeast. In other words, garbage from New Jersey, as it was soon renamed by the unhappy inhabitants of nearby communities. Public perception problems aside, there also were questions about whether the feedstock was suitable for the gasification process.

The proponents of the project revamped the plan, proposing to gasify only coal. That completely changed the economics of the project. Instead of being paid to take half the feedstock going into the facility, the company now faced having to purchase all of its feedstock. As a result, the company could no longer offer its power at a price that would compare favorably to the cost of power produced by coal combustion. With the project far behind schedule and the cost of power no longer attractive, the utility that was to have bought the electricity dropped out. It chose instead to build its own generating facility on the same site.

Although the defunct syngas facility was to be an independent power producer, it nonetheless exemplifies the dilemma that clean coal technology poses for utility regulators.

Our mission at the Kentucky Public Service Commission is to foster the provision of safe and reliable service at a reasonable price to the customers of jurisdictional utilities while providing for the financial stability of those utilities.

How do we do that while embracing leading-edge technologies that may be largely unproven and are likely to be more costly? Can we afford it? How do we do it?

Had the syngas project been proposed by a jurisdictional utility, rather than a company with no ratepayers to place at risk, should the PSC have approved it, given the questions of reliability in the original conception and the issues of cost in the revised proposal? That is a very difficult question.

But situations much like that will be the rule in coming years. We will have to decide when to embrace new technologies, determine how to mitigate the risks and cost associated with those technologies and perhaps develop creative new ways to extend the useful life of the proven and low-cost technologies that provide the bulk of our electricity today.

Kentucky is going to be in a particularly interesting position. It is in our interest to embrace any technology that permits the continued use of coal, even under the strictest imaginable carbon budgets in future decades. However, Kentucky also will be understandably reluctant to relinquish the low-cost electricity that is our most substantial economic development advantage.

Consider just a few of the issues that arise from a jurisdictional utility proposing to build a new type of coal gasification plant in Kentucky:

- What proportion of the utility's customers is in Kentucky?
- If the Kentucky ratepayers are only a small portion of the company's total customers, how will the costs of the facility be allocated?
- If the technology requires proof of concept, who will pay for the development?
- What if the technology doesn't work as expected? Who bears the stranded costs?

- Is the technology the only way for the utility to meet environmental constraints, or are other options available? How do they compare in reliability and cost?

I am not suggesting that Kentucky and states in similar positions are going to resist new coal utilization technologies. What I am suggesting is that we need to enter this transitional period with a clear strategy for protecting the interests of ratepayers and utilities alike.

The financial risks inherent in developing and deploying new technologies can be mitigated by spreading them out over many participants. This could mean consortiums on the FutureGen model, with multiple private and public entities coming together to provide proof on concept before a new technology is deployed on a widespread basis.
It could mean several utilities within a state joining to fund and build new facilities, thus spreading the costs over a wider rate base. Similar consortia could extend across state lines. If a technology proves viable, the rewards will be shared by all. If it does not, no one entity will be unduly burdened by the cost of failure.

In order to insulate ratepayers from the costs of developing new technologies, companies could be given tax incentives that defray a portion of the development costs, leaving less to be passed on in rates. Admittedly, this socializes the costs of these technologies. But given that the ultimate goal is to reduce environmental impacts, socialization of costs may be entirely appropriate.

Finally, I think it is important – particularly as we move farther into this transitional period in our use of coal – that we not become so enamored of and focused on new technology that we neglect to employ measures that allow us to move toward the same goals as we continue to use our existing infrastructure. After all, a ton of carbon removed from the atmosphere now is arguably more effective in

stemming global climate change than a ton of carbon not emitted 10 years from now.

Assume that coal-using utilities are going to face the same kind of emission caps on carbon in the future that they face on other emissions today, complete with allowances, credits and trading. To meet those caps, utilities will likely employ a mix of strategies – use of clean coal technologies that emit less carbon per unit of power produced, conservation measures that reduce coal consumption and the sequestration of carbon.

The latter two strategies are already with us. We simply need to employ them more creatively.

Conservation is simply demand-side management, the cost of which is recoverable in rates in Kentucky and I think nearly every other state. We could certainly be doing more in this area, whether on the micro scale of one compact fluorescent bulb at a time or on the macro scale of developing new technologies for reducing transmission line losses.

As for the third strategy, a bumper sticker suggests itself: “Sequester carbon. Plant a tree.” I can certainly envision a day in the not-too-far-distant future in which a portion of the surcharge through which Kentucky’s electric utilities recover their environmental compliance costs goes toward reforestation projects in the Amazon Basin or sub-Saharan Africa, or on mined-over coal lands in Harlan County, Kentucky.

If Kentuckians – particularly those of us raised in the coalfields – understand one thing about coal, it is that the benefits we derive from it are accompanied by costs. Costs to those who mine the coal. Costs to the communities in which it is produced and combusted. Costs to the environment, whether local or global.

The balance between those costs and benefits has always shifted – sometimes gradually, often abruptly, and always with little regard for the protestations of those who insisted that no change was necessary.

It appears that another significant rebalancing is upon us, perhaps the most significant yet.

We face the challenge of finding ways to continue to utilize our abundant and relatively inexpensive coal resources to produce electricity while meeting the scientific, political and policy constraints of the 21st Century.

We know that we cannot afford many false starts on the road to new technologies. We know also that we cannot rely solely on innovative ways of utilizing coal to attain that new balance point, wherever it ultimately may rest.

Yes, we must invest real and intellectual capital in clean coal technologies. But we must commit the same degree of creativity and investment to improving our energy efficiency and reducing the impacts of existing facilities.

Because Kentucky has so much riding on the outcome, I can assure you that our leaders will be fully engaged in every aspect of the effort to develop a comprehensive approach to coal utilization for the remainder of this century and beyond. I would encourage all of you to remain active in the discussions and debates. I thank you for the opportunity to share my thoughts with you and I welcome your comments and questions.